



Tropospheric Ozone and CO monthly mean fields from TES and GEOS-CHEM model

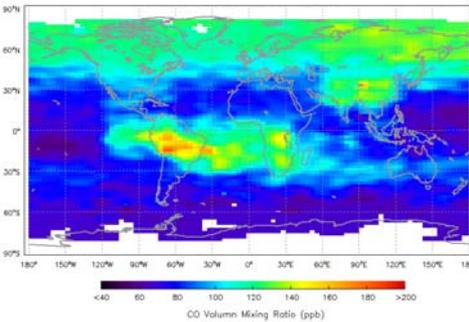
M. Luo, N. Richards and the TES team
September 2006

GEOS-Chem results provided by the Harvard
Atmospheric Chemistry and Modeling Group

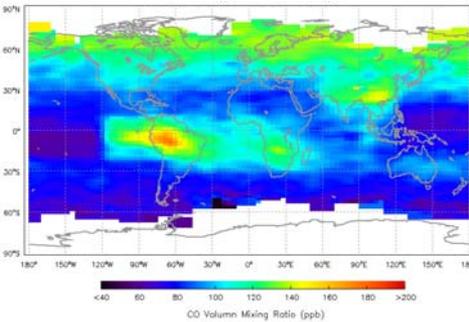


TES CO Monthly Means at 681.3 hPa

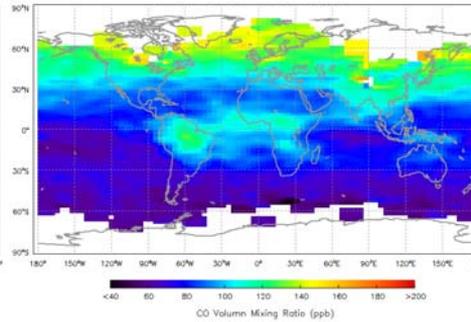
September 2005



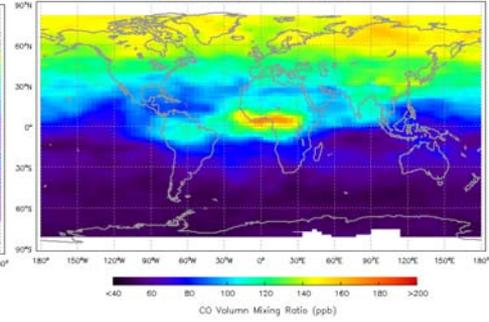
October 2005



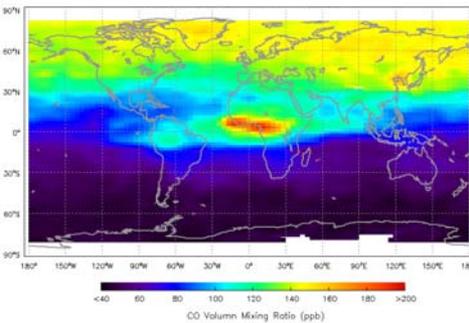
November 2005



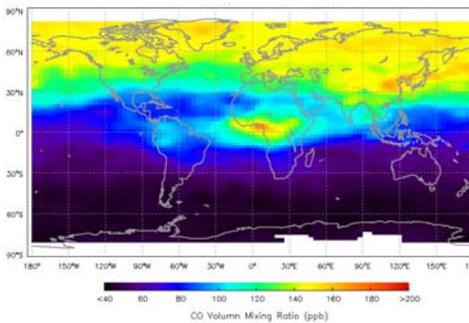
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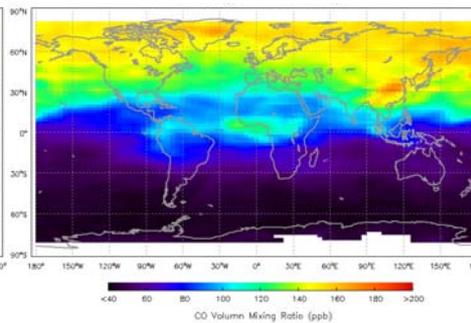
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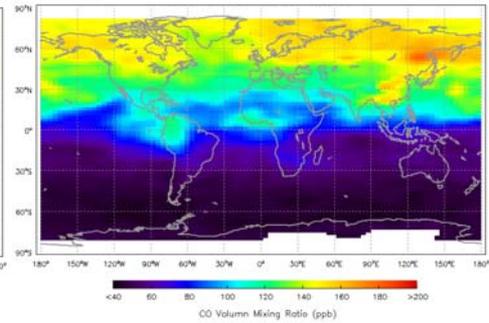
February 2006



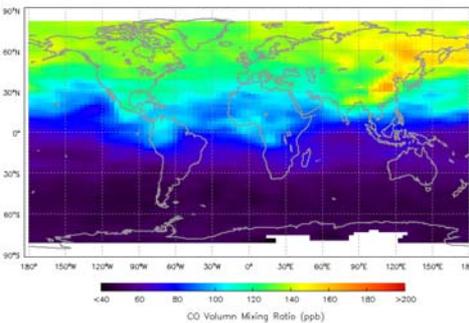
March 2006



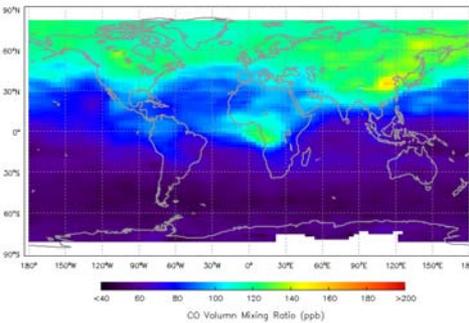
April 2006



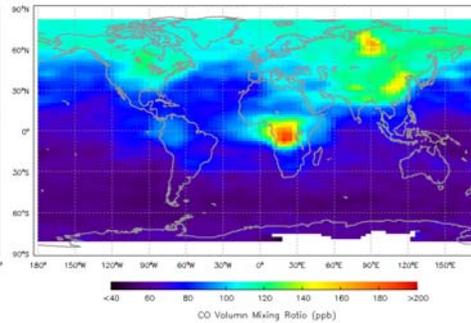
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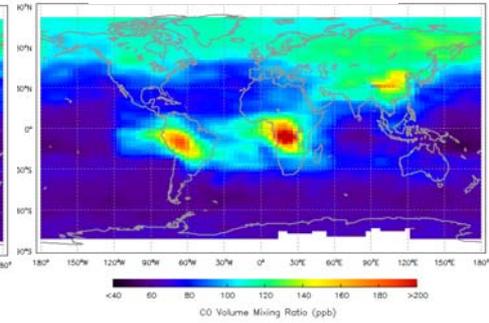
June 2006



July 2006

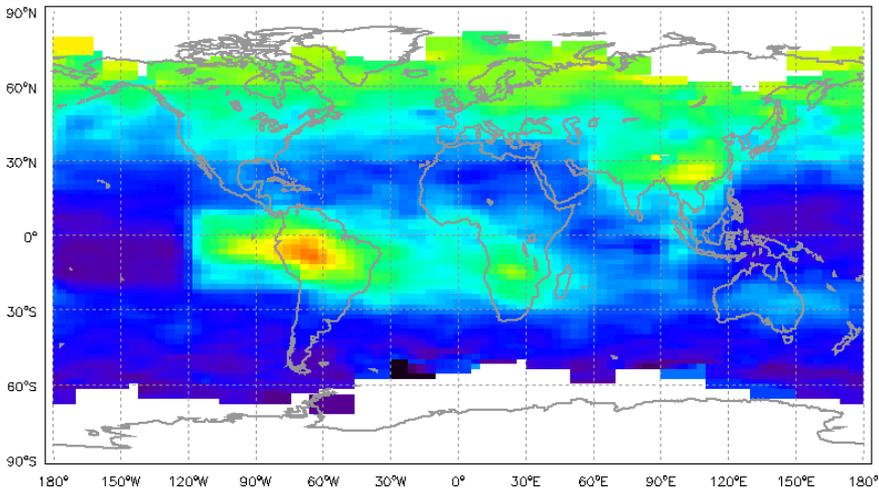


August 2006

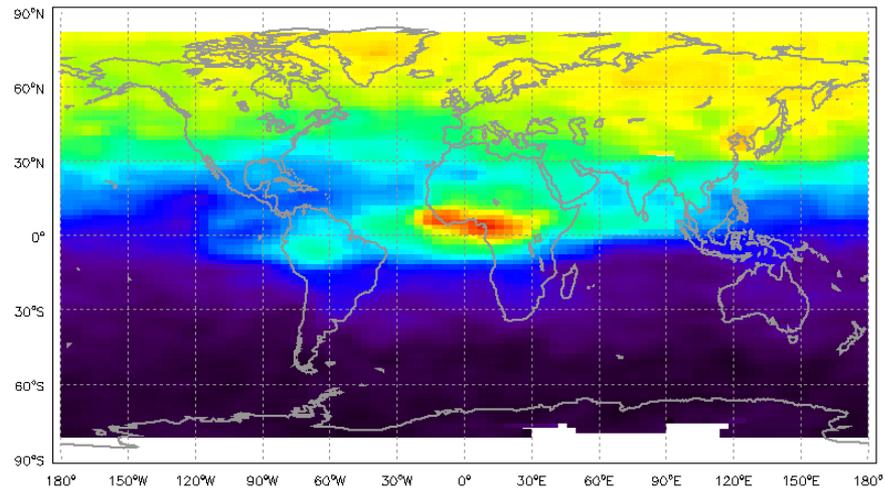


TES CO Monthly Means at 681.3 hPa

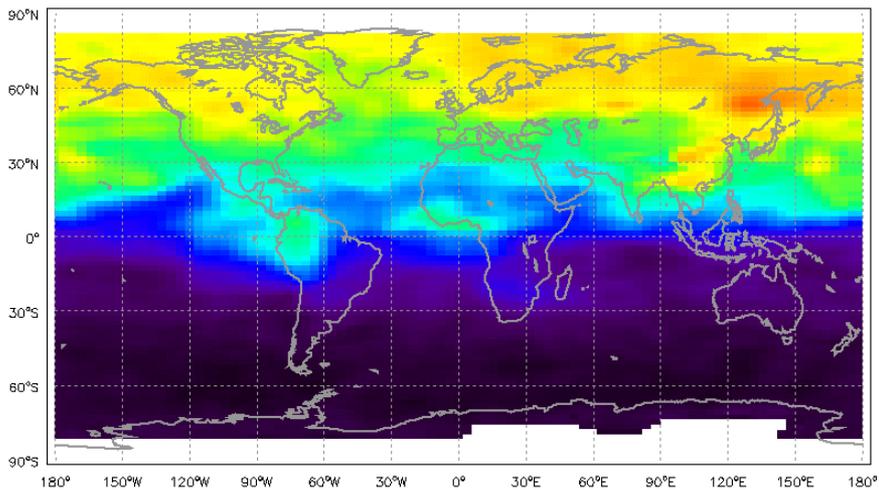
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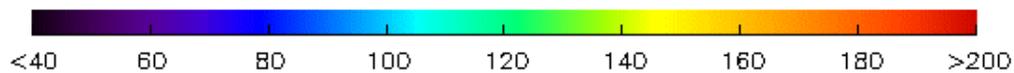
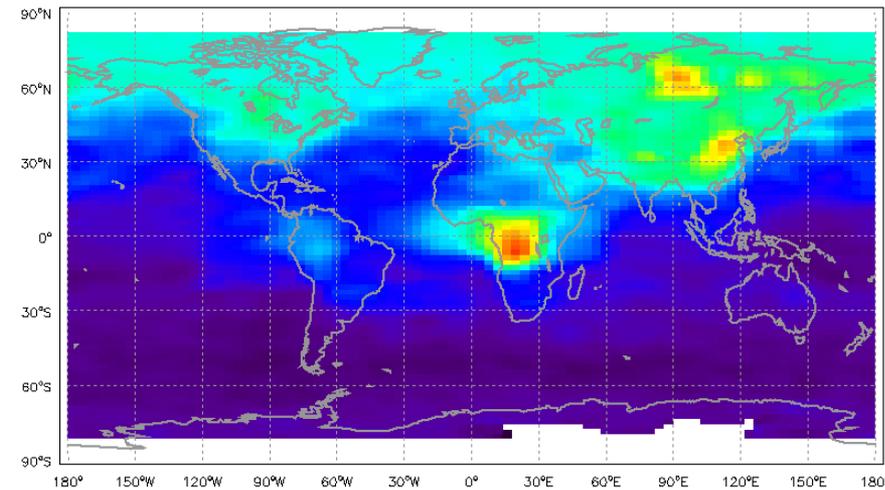
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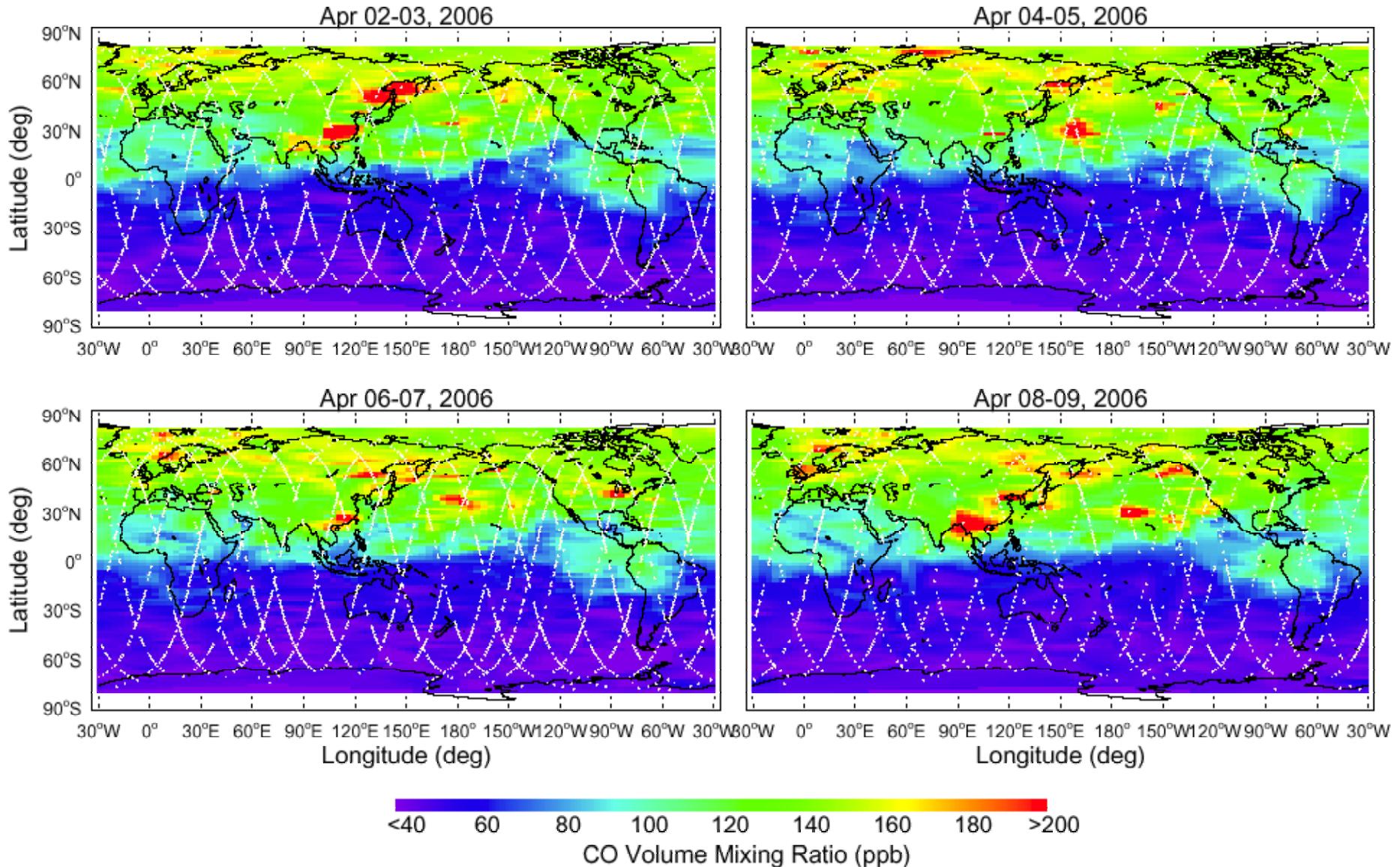


July 2006



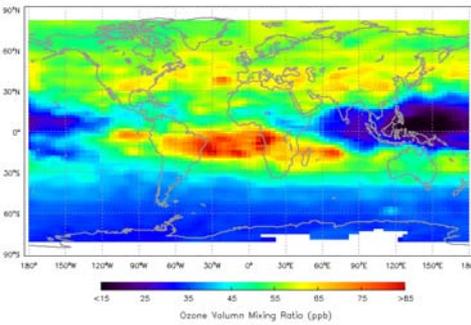
CO Volume Mixing Ratio (ppb)

Examples of TES daily measurement of global CO field: four consecutive global surveys, 681.3 hPa

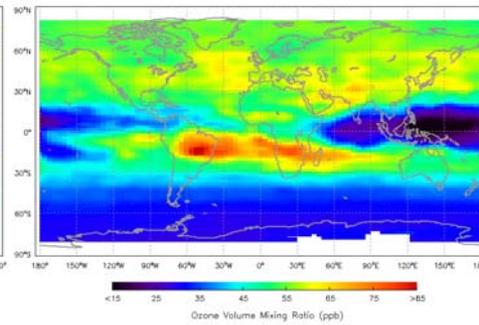


TES **Ozone** Monthly Means at **681.3 hPa**

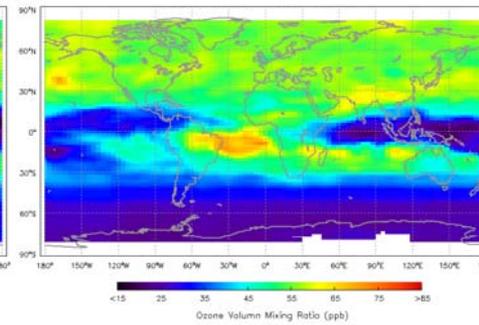
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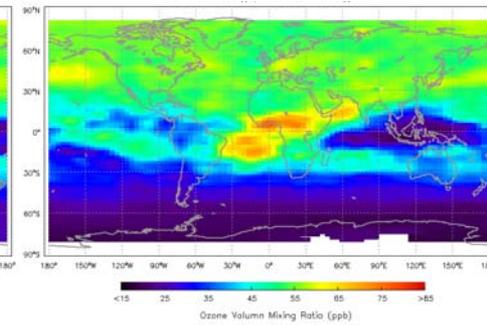
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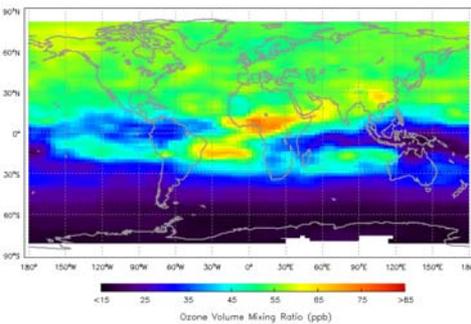
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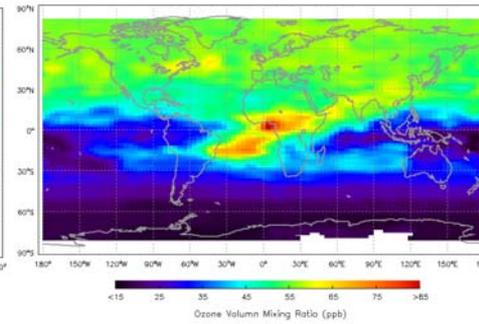
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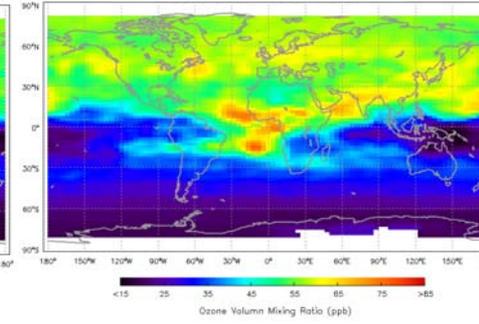
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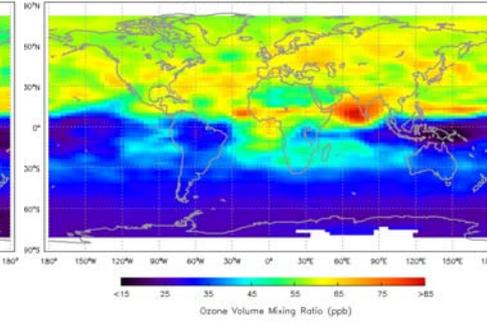
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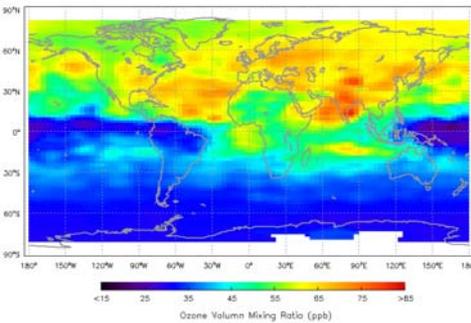
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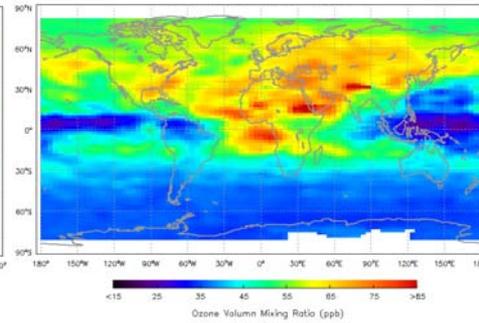
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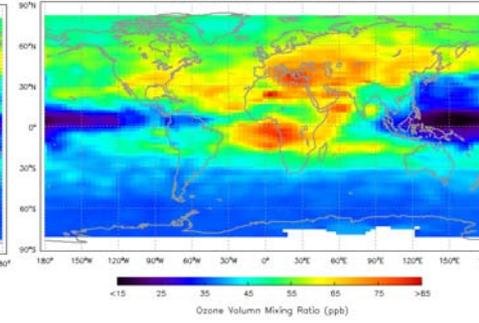
May 2006



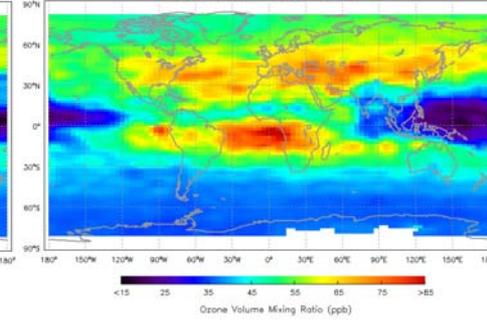
June 2006



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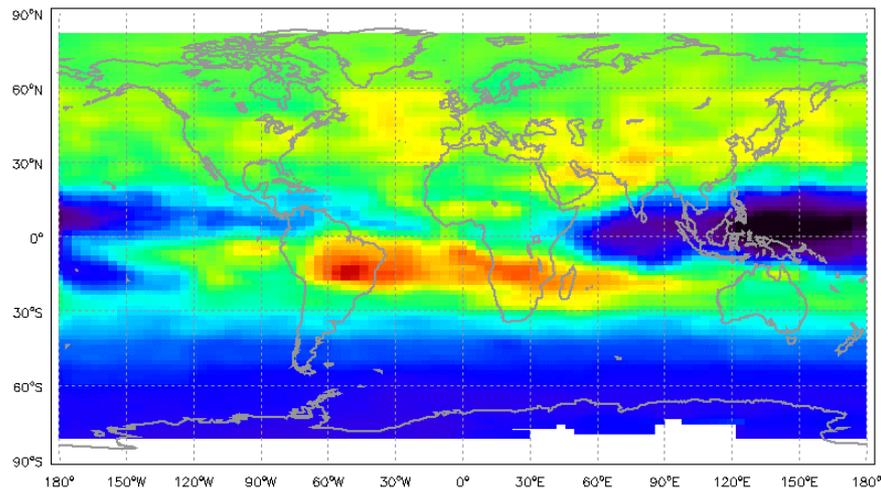


August 2006

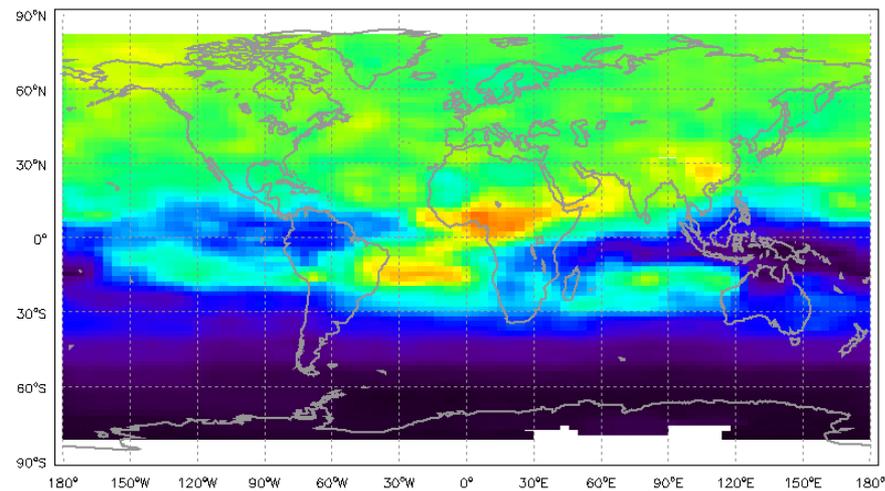


TES Ozone Monthly Means at 681.3 hPa

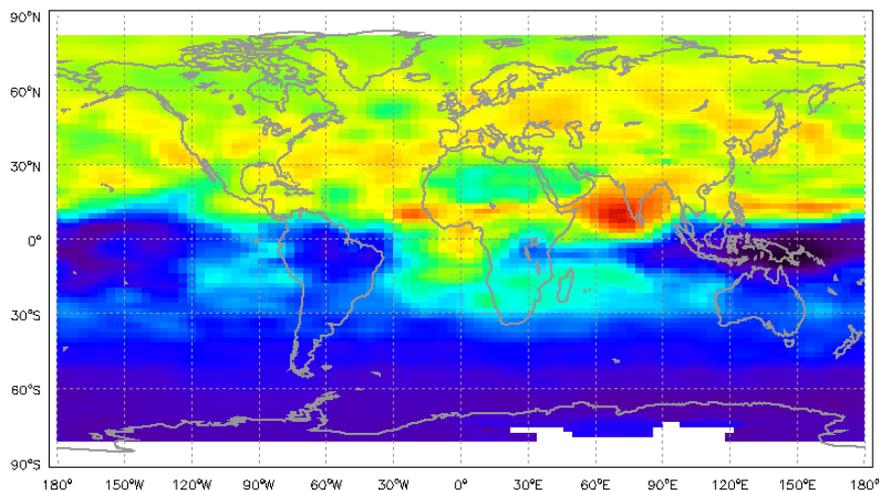
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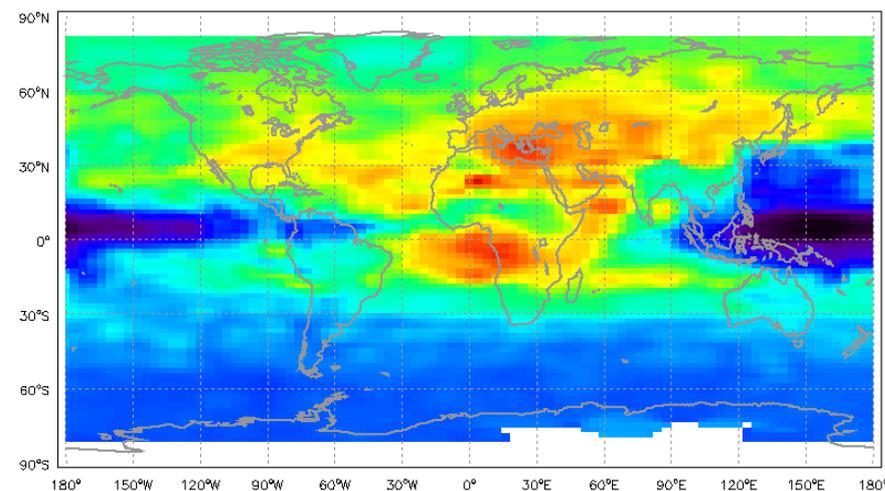
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April 2006



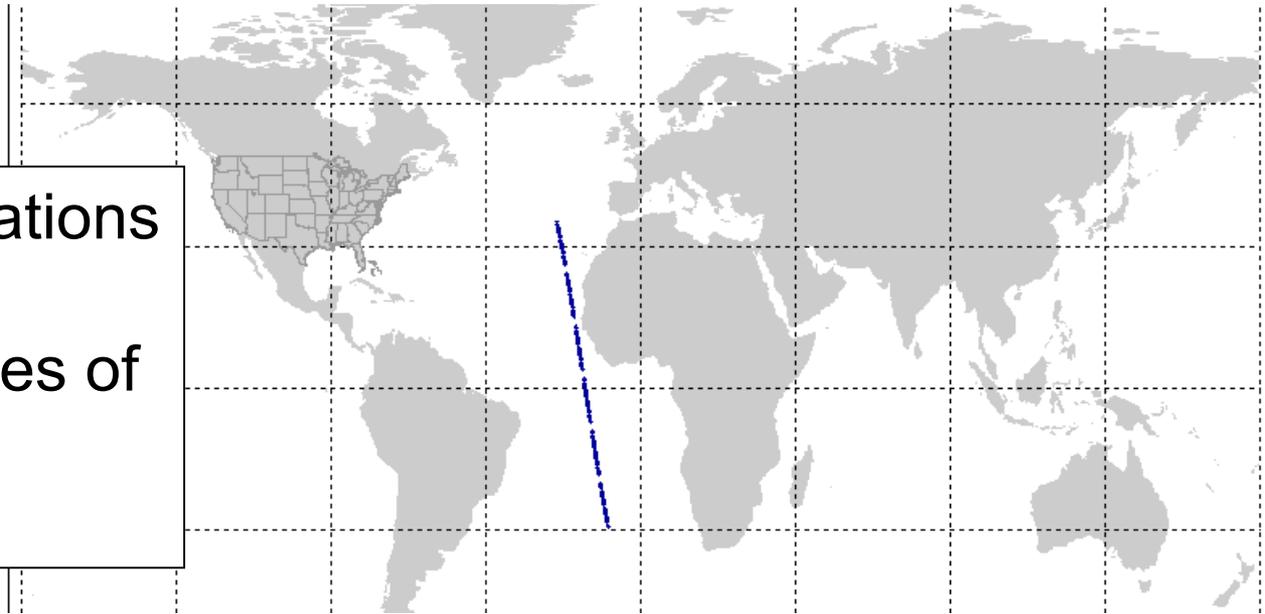
July 2006



Ozone Volume Mixing Ratio (ppb)

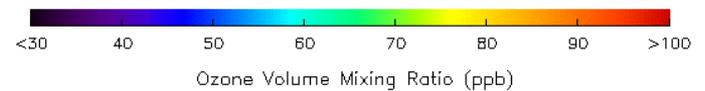
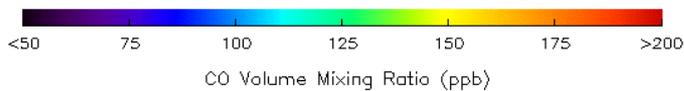
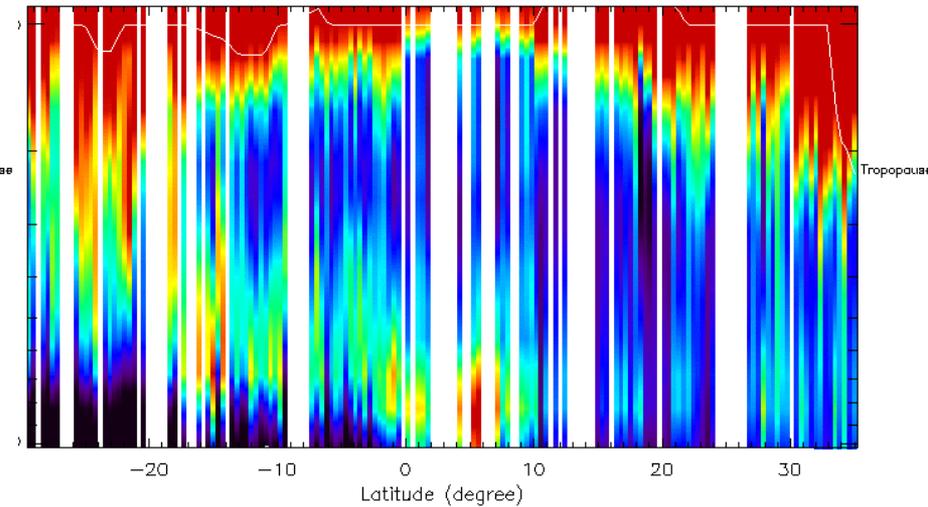
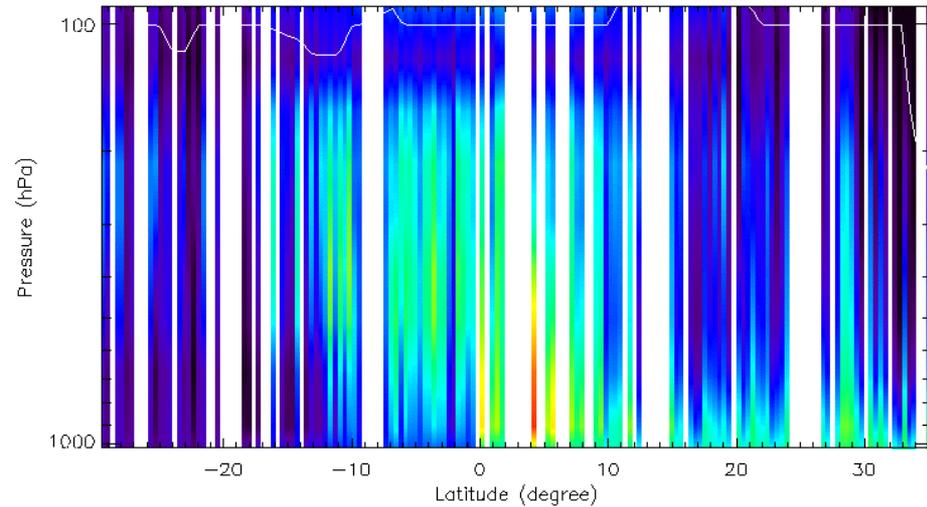
Step & Stare observations: January 22, 2005

TES Special Observations and Global Surveys provide vertical profiles of ozone and CO in the troposphere.



CO

Ozone





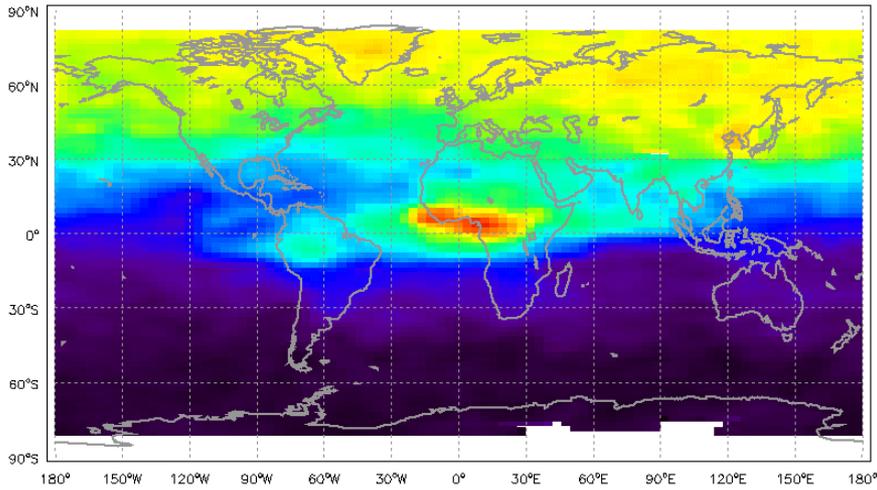
TES CO and Ozone monthly global distributions in the lower troposphere

- CO fields clearly coincide with known biomass burning and pollution sources and show expected seasonal transport /chemistry patterns
 - NH > SH. Higher CO in boreal winter/spring in high N latitudes.
 - Biomass burning areas of Africa at N and S of equator in the two seasons respectively and Aug-Nov in S America.
 - Severe pollutions in China in all seasons and the July Siberia fire.
- TES provides first global retrievals of tropospheric ozone. TES O₃ fields agree in general with current understanding of the tropospheric ozone distributions
 - NH > SH. Higher O₃ in boreal spring/summer in N mid latitudes.
 - Tropics: enhanced O₃ correlated with enhanced CO in the biomass burning areas. There are also high O₃ displaced from the CO highs, e.g., double max in Dec - Feb.
 - Other noticeable enhanced O₃ areas in N hemisphere: India (Arabian Sea) in April-May; Covering 120W – 120E (max in Mediterranean Sea) in spring/summer.

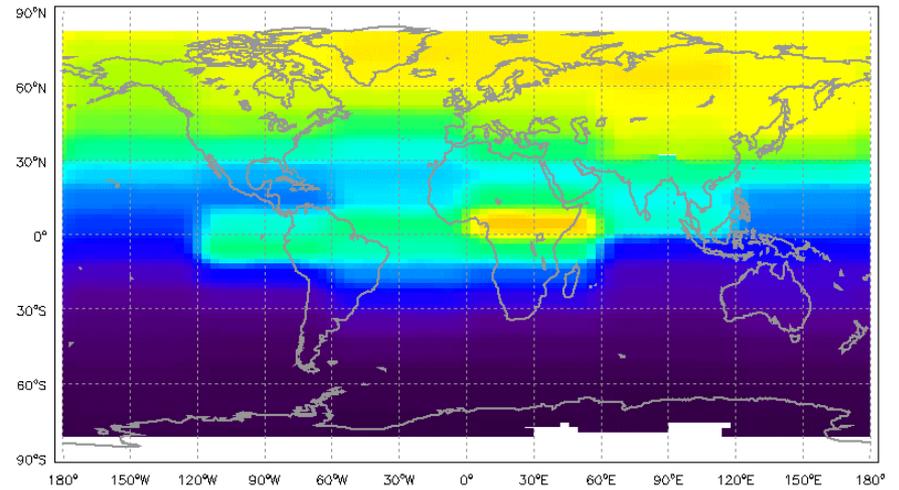


CO: January 2006, 681.3 hPa

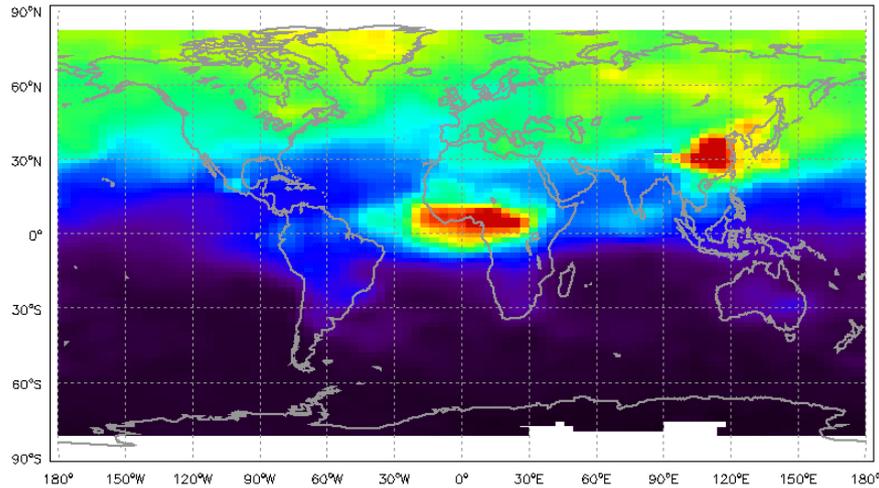
TES



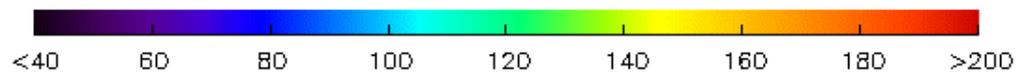
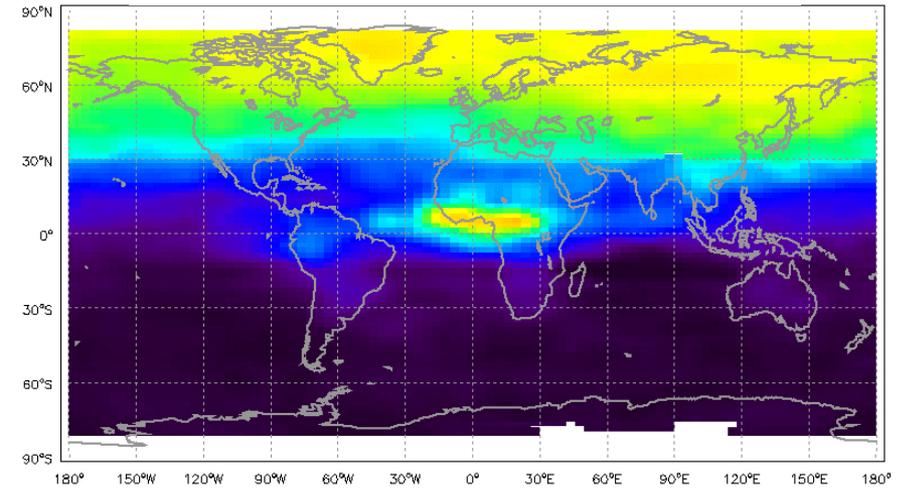
a Priori, Xa



GEOS-CHEM



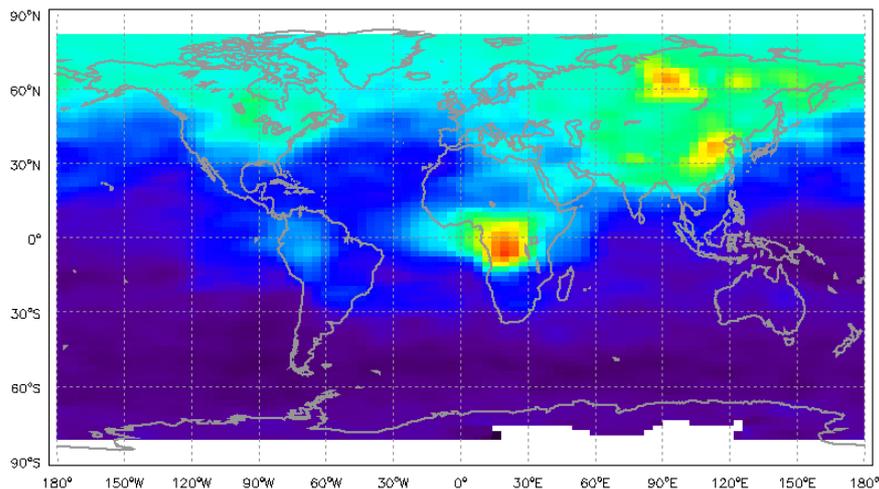
GEOS-CHEM w TES AK&Xa



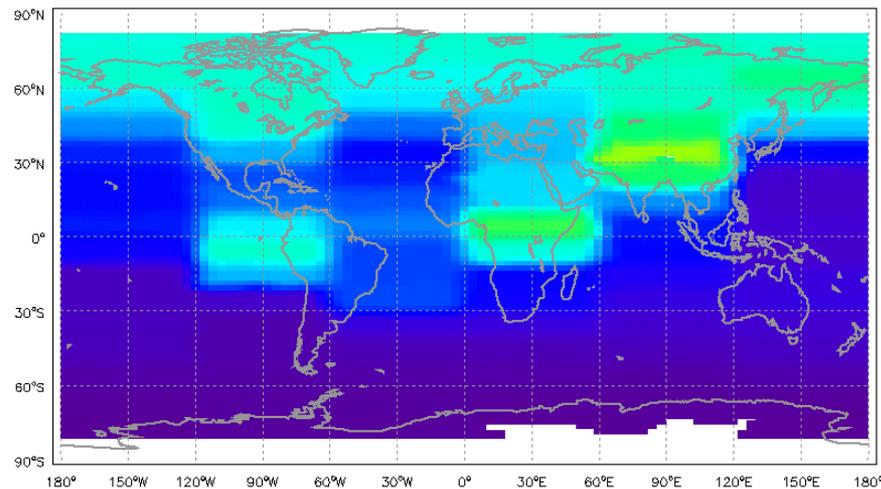
CO Volume Mixing Ratio (ppb)

CO: July 2006, 681.3 hPa

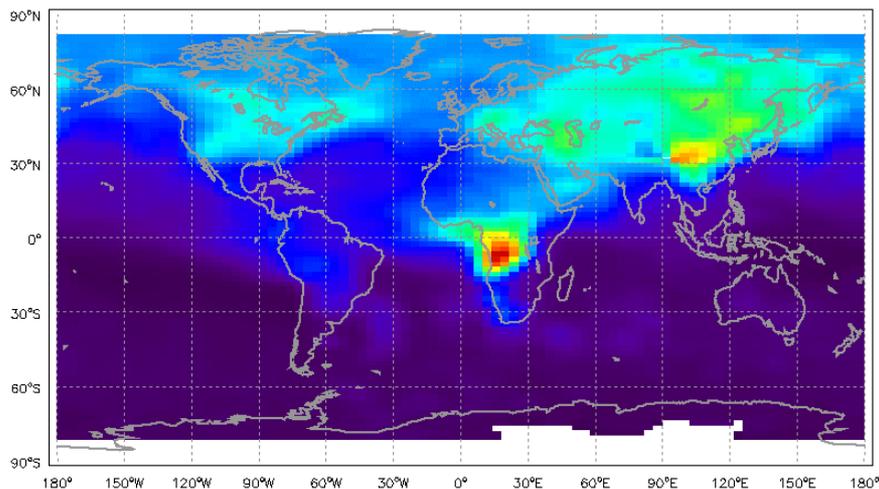
TES



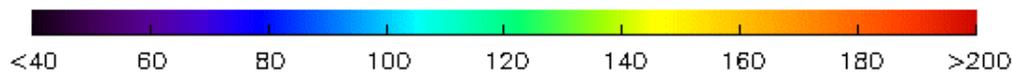
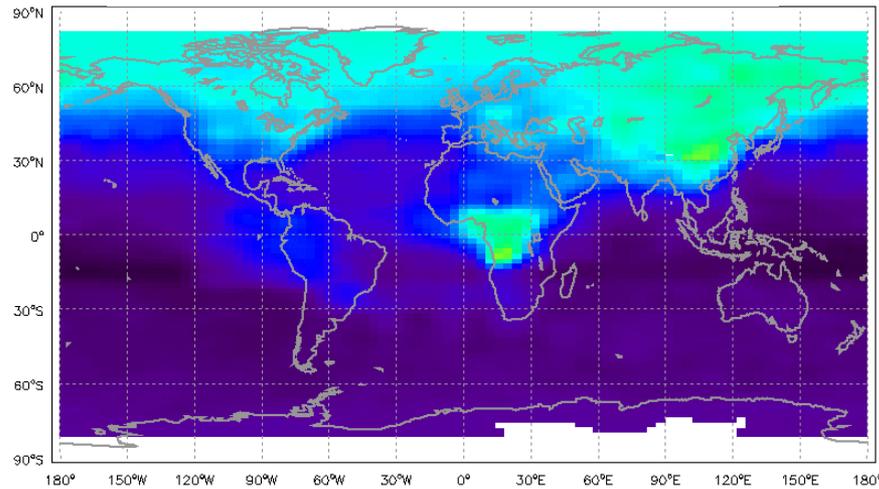
a Priori, Xa



GEOS-CHEM



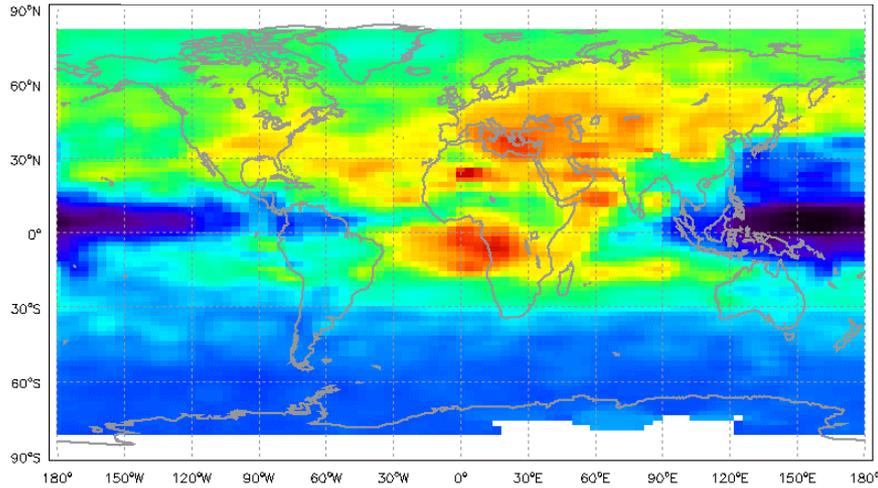
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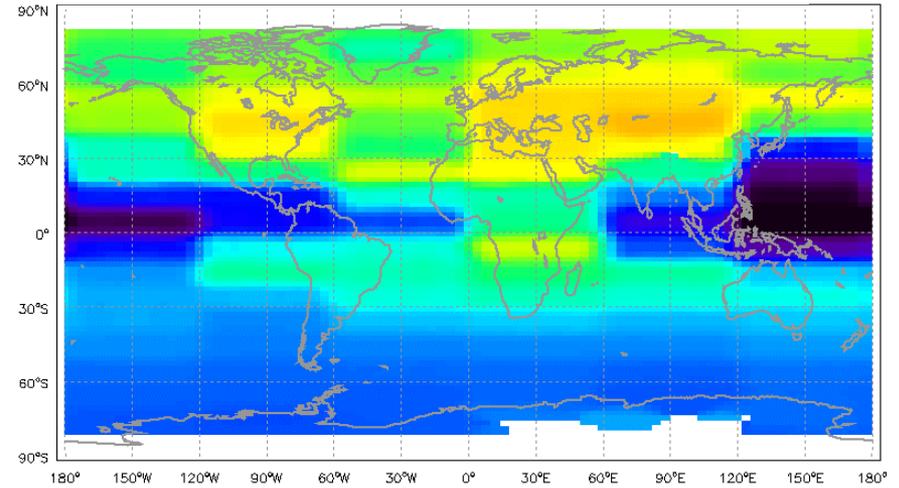
CO Volume Mixing Ratio (ppb)

Ozone: July 2006, 681.3 hPa

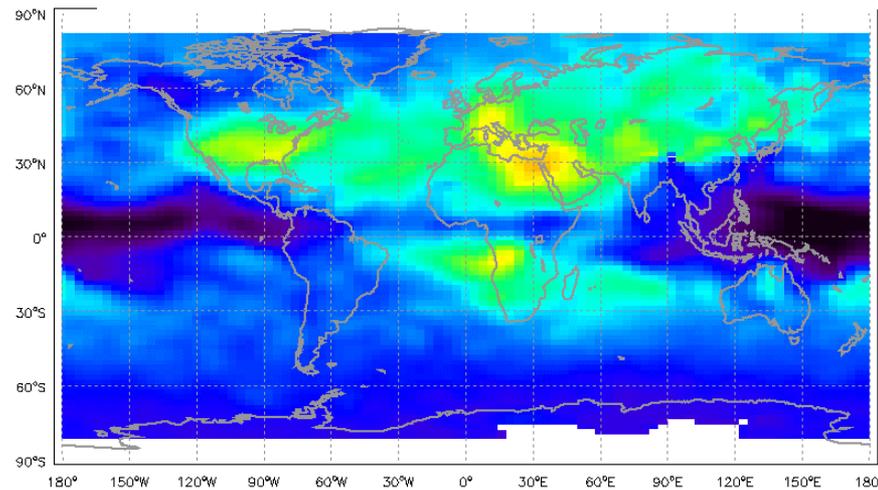
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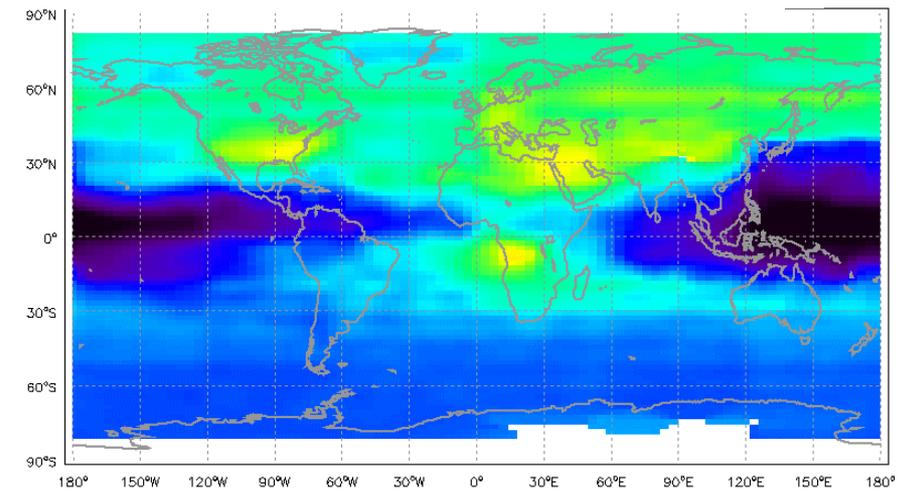
A Priori, Xa



GEOS-CHEM



GEOS-CHEM w TES AK&Xa



Ozone Volume Mixing Ratio (ppb)



TES – GEOS-CHEM model comparisons

- The comparisons become better/worse after applying TES a priori and AK to the model profiles – strong indications of the influences of the a priori info to the TES retrievals.

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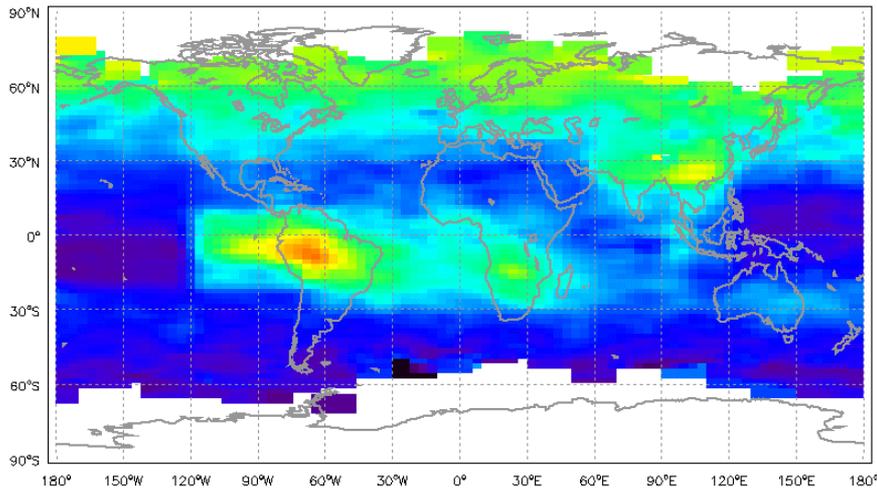


No time to show the following TES-
Model comparisons, for Oct 2005 and
April 2006 ...

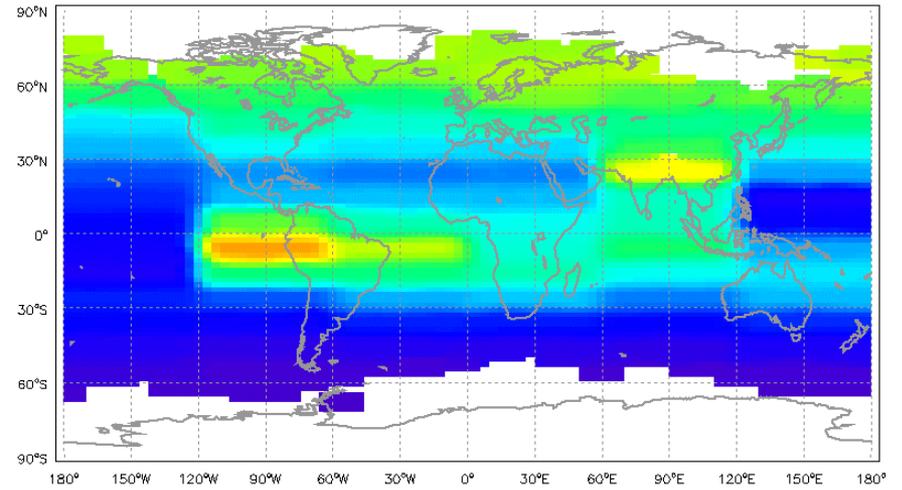


CO: October 2005, 681.3 hPa

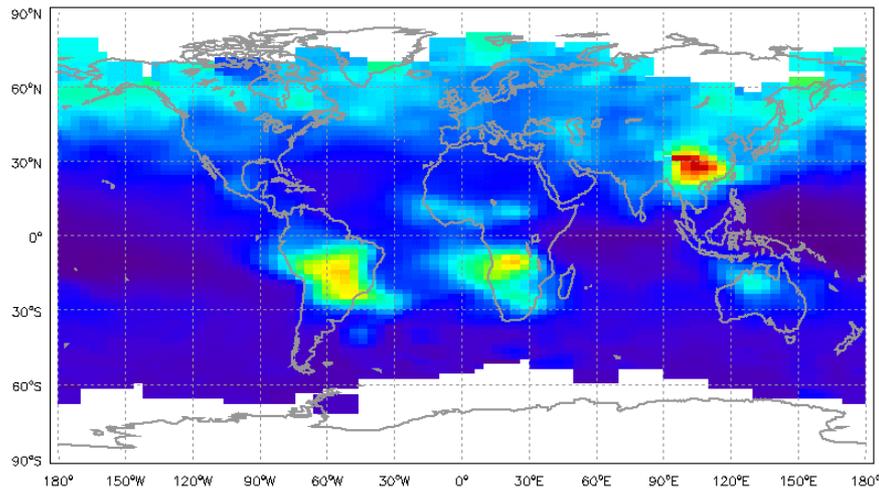
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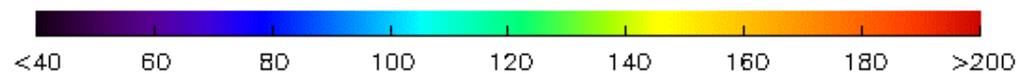
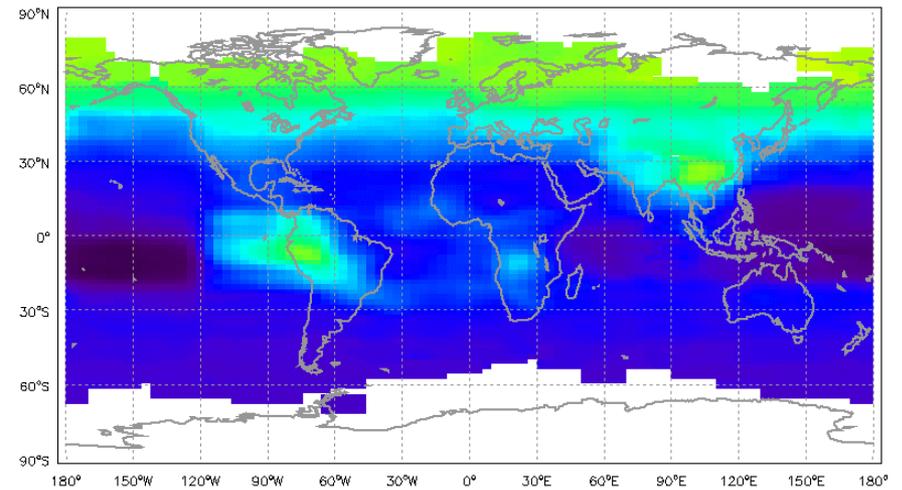
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GEOS-CHEM



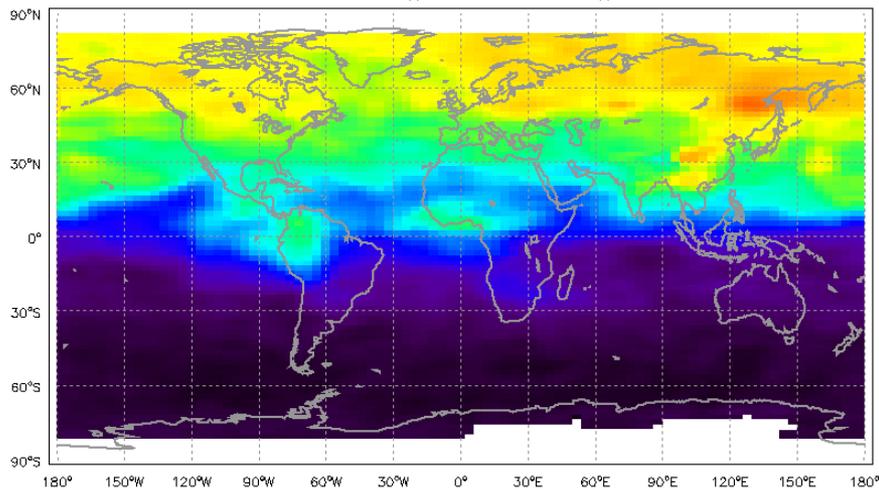
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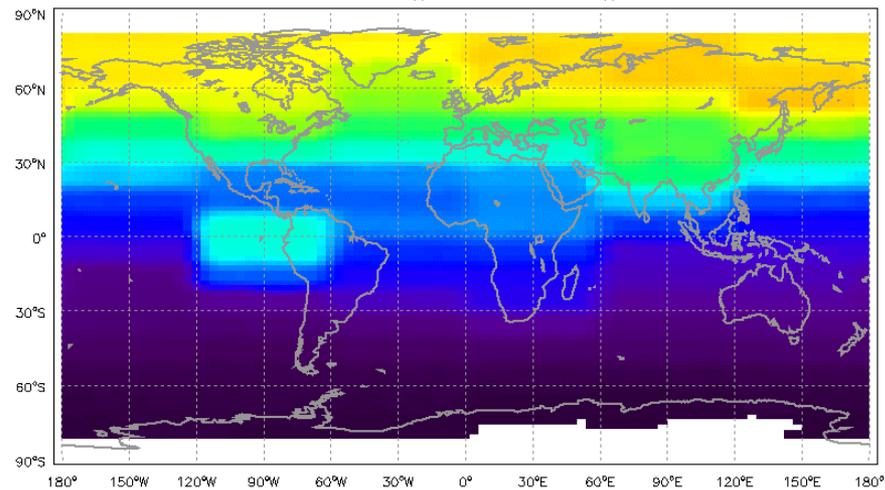
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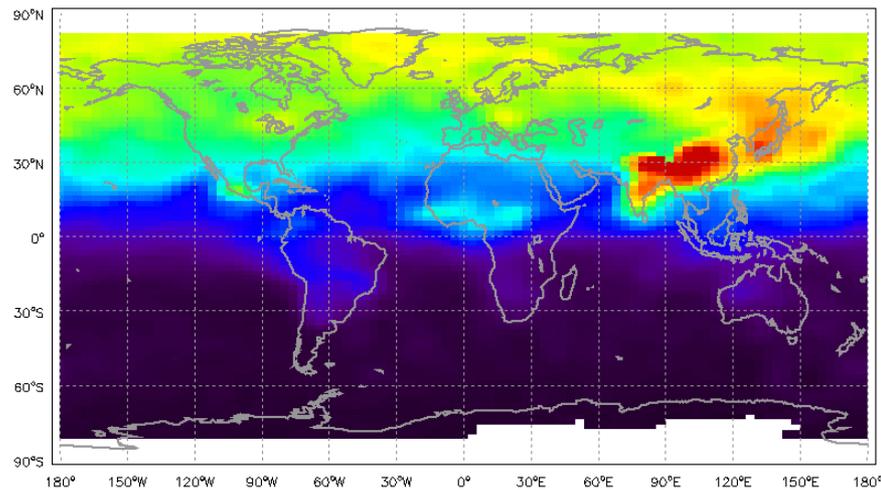
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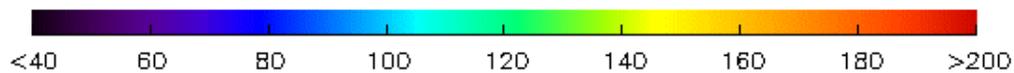
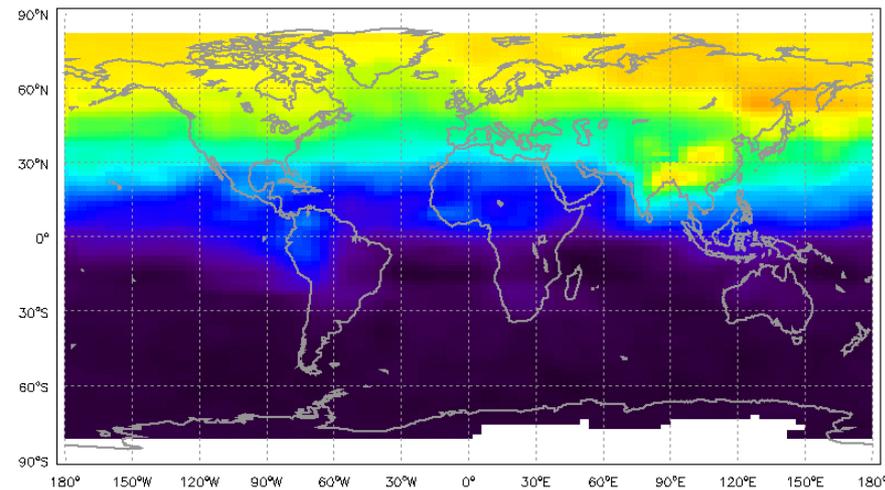
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GEOS-CHEM



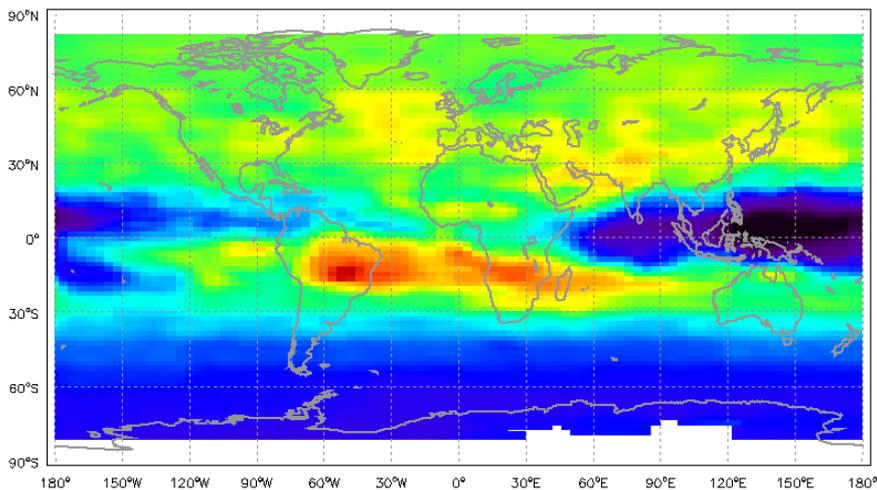
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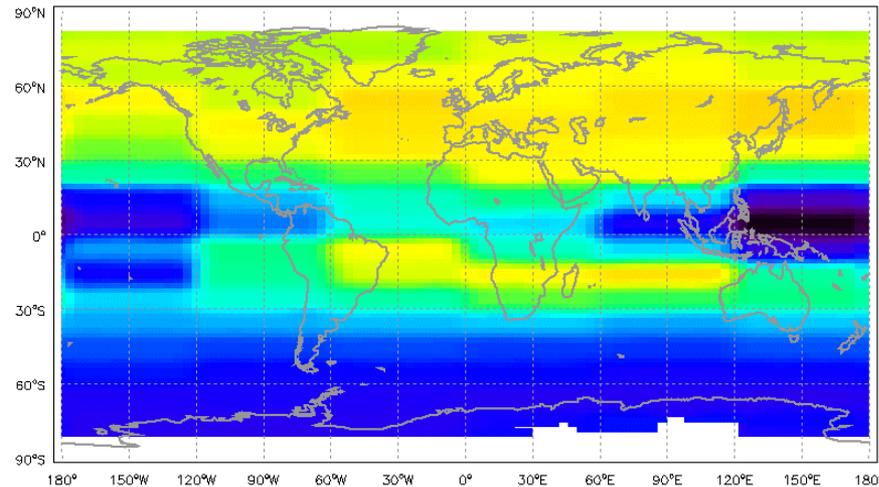
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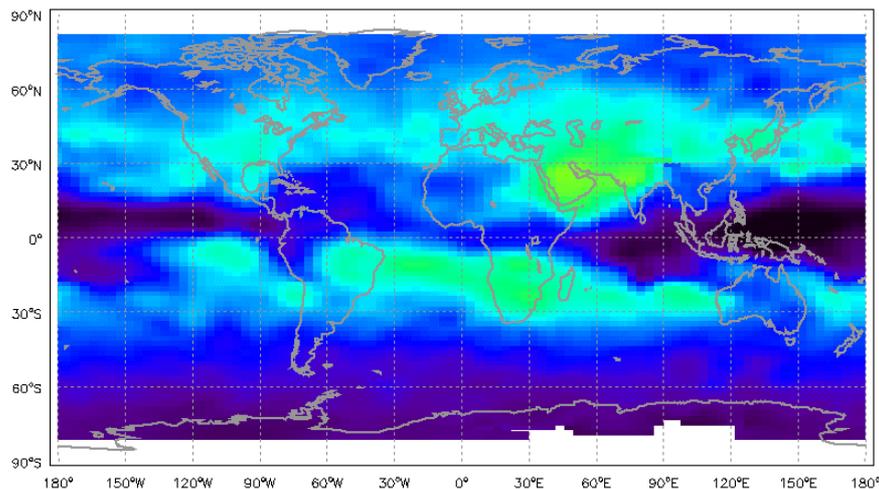
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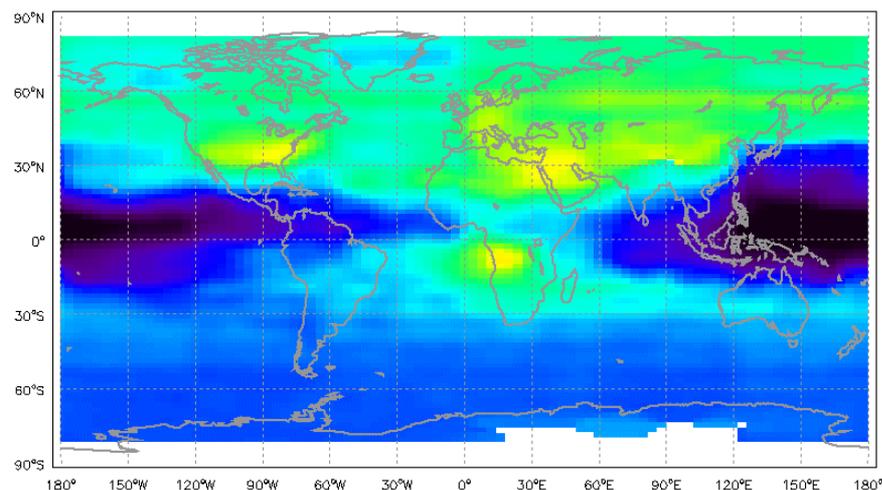
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GEOS-CHEM



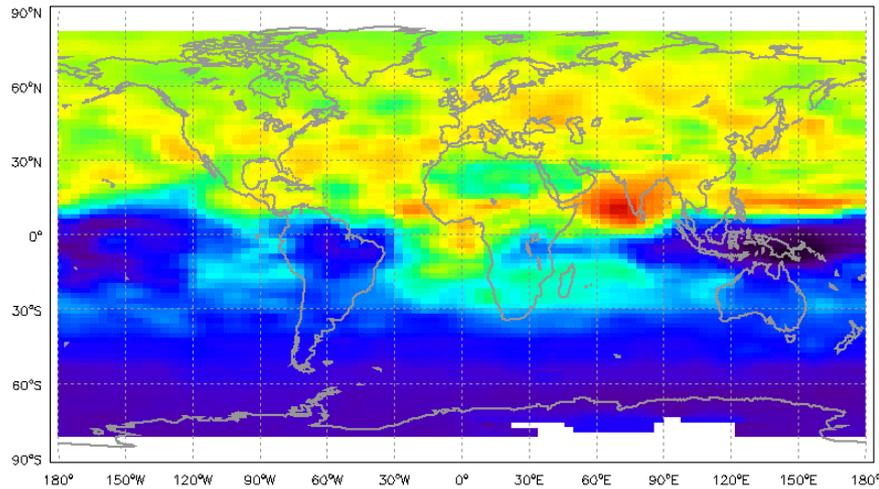
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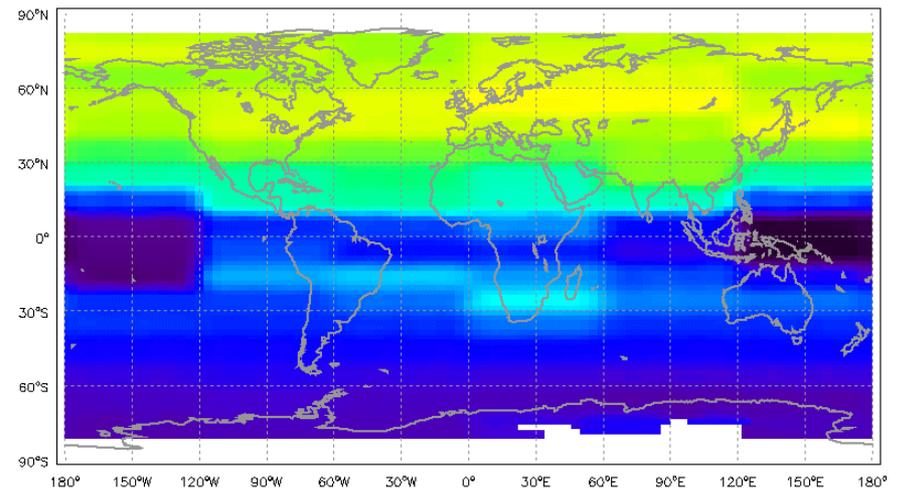
Ozone Volume Mixing Ratio (ppb)

Ozone: April 2006, 681.3 hPa

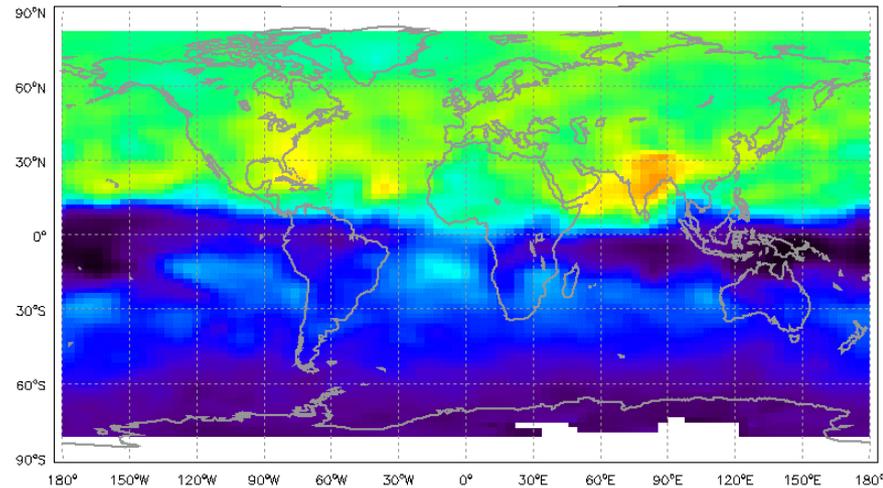
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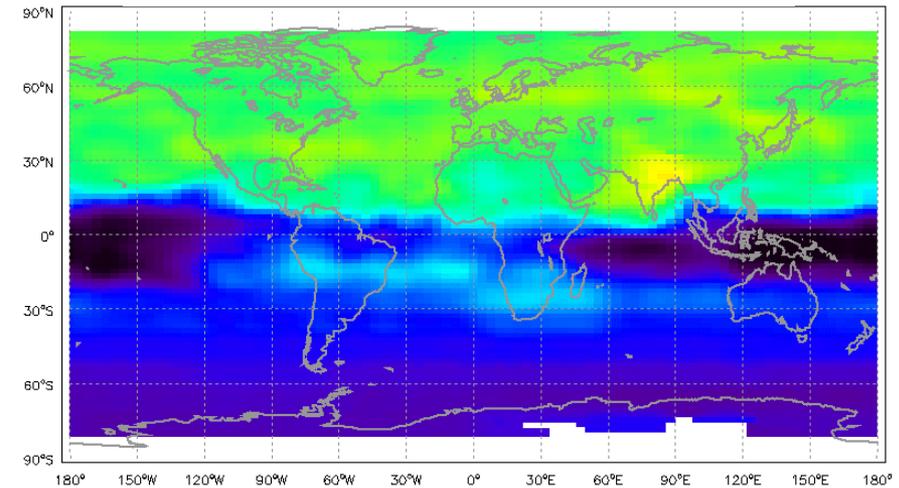
a Priori, Xa



GEOS-CHEM



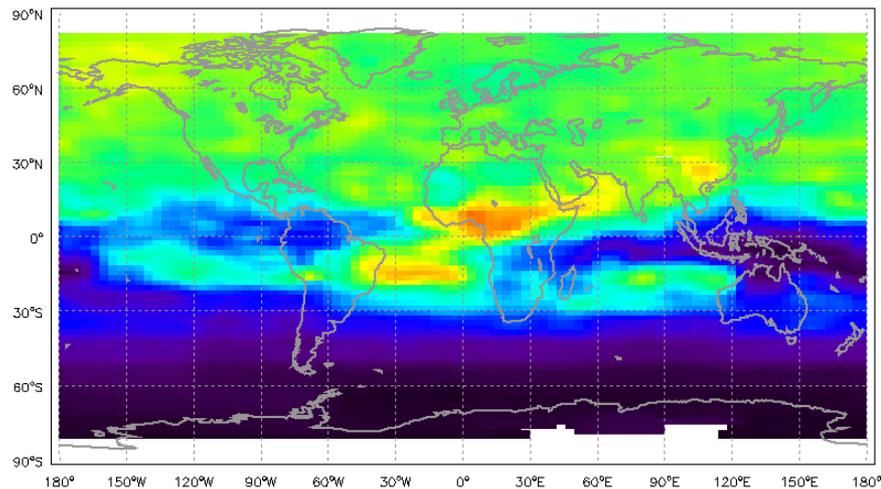
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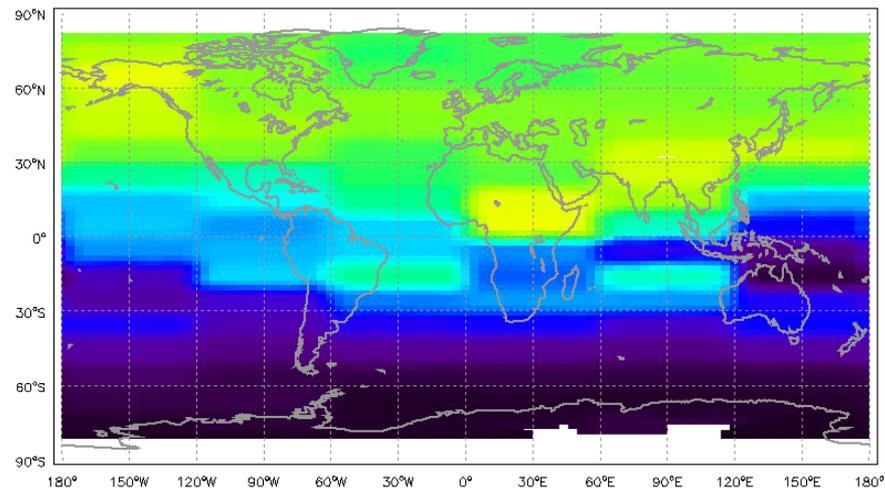
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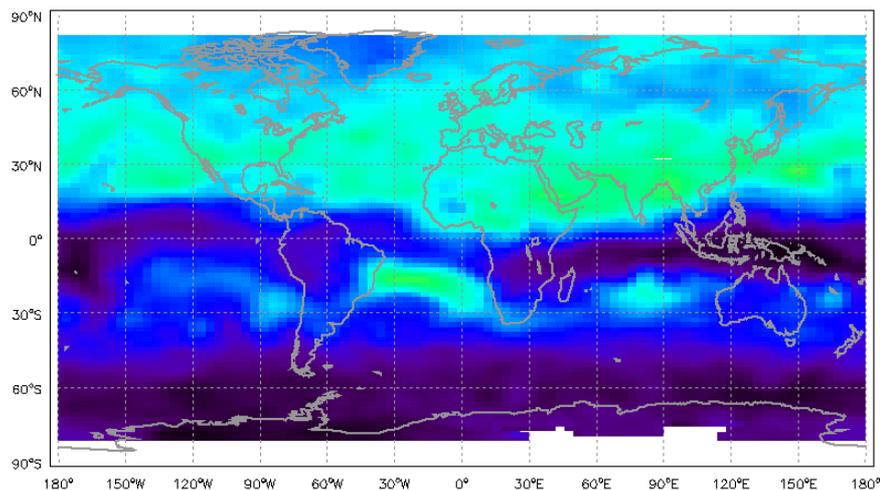
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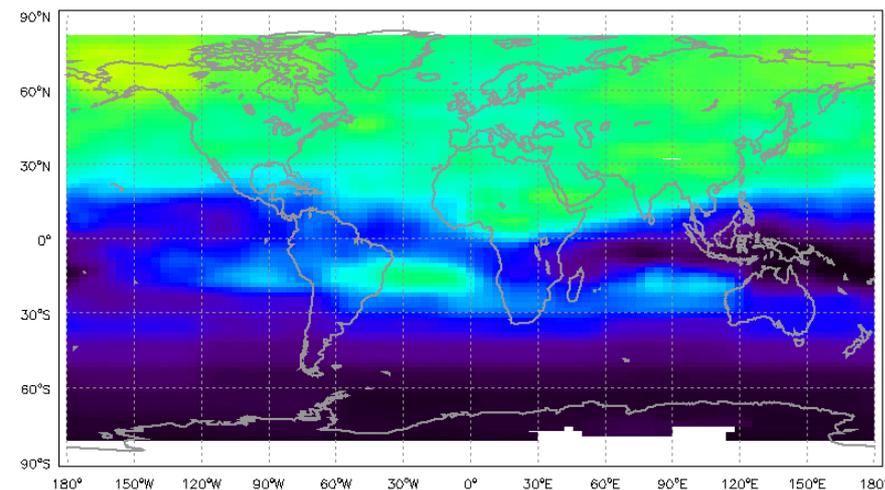
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GEOS-CHEM



GEOS-CHEM w TES AK&Xa



Ozone Volume Mixing Ratio (ppb)